

1989 GYPSY MOTH INTEGRATED PEST
MANAGEMENT PROGRAM ACTIVITIES

CATOCTIN MOUNTAIN PARK
THURMONT, MARYLAND

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CATOCTIN MOUNTAIN PARK
THURMONT, MARYLAND

BACKGROUND

In 1986, an intensive gypsy moth monitoring/IPM program was initiated at Catoctin Mountain Park (CMP). The objective of the program was to increase monitoring efforts at CMP in order to track gypsy moth population build-up and to initiate and evaluate tactics that show promise in low level population management prior to the occurrence of widespread defoliation.

As a result of the monitoring activities, areas within CMP have been selectively chosen to suppress rising gypsy moth populations. To date, the treatments have all been by means of an aerial application of the microbial insecticide, Bacillus thuringiensis (B.t.) Wide-spread defoliation and subsequent mortality have been prevented at CMP.

The scope of activities in 1989 included a suppression project involving 3045 acres, male moth trapping, defoliation surveys, and egg mass surveys over all of CMP. Gypsy moth populations at CMP and surrounding areas have declined and no suppression activities are recommended in 1990.

INTERVENTION ACTIVITIES - 1989

Suppression Project

In 1989, six areas totalling approximately 3045 acres were aerially treated with B.t. (Figure 1). An aqueous formulation of B.t. (Dipel 8AF) was applied at the rate of 16 BIU (billion international units) in 1.0 gallon of total mix per acre. Each of the treatment areas received two applications except treatment area D, which received only one application. Treatment area A was approximately 630 acres and included all of Camp David and adjacent portions of CMP. Treatment areas B, E, and F totaled approximately 1230 acres and encompassed Chestnut Picnic Area, Blue Ridge Summit Vista and most of the Park between Park Central Road and Route 77. Treatment area C was approximately 845 acres and encompassed a large portion of CMP west of Manahan Road. This area also included Owens Creek Campground and Owens Creek Picnic Area. Treatment area D was approximately 340 acres and was located in the eastern portion of CMP.

On May 20-22, all of these areas were treated with the first application of B.t. The second application was applied to areas A,B,C,E, and F from May 26 to May 31. Both applications were applied by Helicopter Applicators, Inc. of Myersville, MD. A complete summary of the suppression activities is available.^{1/}

DETECTION ACTIVITIES - 1989

Defoliation Survey

The gypsy moth defoliation survey results were obtained using conventional aerial sketch mapping techniques on June 26 and through interpretation of our high altitude Optical Bar Camera project conducted on June 30. No defoliation was detected in any of the treatment areas or elsewhere in the Park. In addition, no defoliation was detected in areas adjacent to CMP. The low altitude color infrared photo mission that was planned for CMP was not conducted due to inclement weather.

MONITORING ACTIVITIES - 1989

Male Moth Trapping

The standard milk carton trap was deployed at 85 of the grid points during early summer. The traps were checked either once or twice, the last check being in mid-August to mid-September. When a trap was checked, the male moths were counted and discarded. Some of the traps were disturbed by small mammals so estimates were made in those traps based on the number of wings found. Figure 2 shows the grid point locations and the number of male moths caught at each location. Male moth catches ranged from 0 to 1742 and averaged 402 per trap. The average catch per trap decreased approximately 58 percent from the 1988 average of 962 male moths per trap. A comparison of the 1988-89 cumulative male moth catch is presented in Table 1. Only eight grid points caught more moths in 1989 than in 1988.

Egg Mass Surveys

Egg mass surveys using 1/40th acre fixed-radius plots were conducted at all 89 grid points in November. Figure 3 shows the grid point locations and the egg mass counts at each point. Table 2 presents a comparison of 1988-89 egg mass counts per acre for each grid point. Egg mass counts ranged from 0-200 and averaged 12 egg masses per acre (EM/A). This represents a reduction of

^{1/}Schneeberger, N.F. 1989. Summary Report of 1989 Gypsy Moth Suppression Activities, Catoctin Mountain Park and Naval Support Facility, Thurmont, Maryland. Office Report. August 1989.

approximately 92 percent compared to 1988 egg mass trapping results of 146 EM/A. Egg masses were detected on 18 percent of the plots in 1989 versus 49 percent in 1988.

In addition to the 1/40th acre fixed radius plots, 26 five-minute walks were conducted in the same areas where walks were conducted the previous year (Figure 3). Egg mass densities from these five-minute walks ranged from 0-97 and averaged 9 EM/A (Table 3). Egg masses were detected on only 19 percent of the five-minute walks.

Based upon the data collected using both 1/40th acre fixed-radius plots and five-minute walks, egg mass counts range from 0-200 and average 11 EM/A parkwide. Gypsy moth populations have decreased approximately 98 percent compared to the 1988 average of 453 EM/A.

Egg mass densities in the treatment areas have decreased dramatically compared to pre-treatment levels (Table 4), ranging from 89 to 99 percent. Post-treatment egg mass counts range from 4 to 27 EM/A compared to pre-treatment levels of 45-1324 EM/A.

Egg mass surveys were conducted in the vicinity of CMP by the Maryland Department of Agriculture. A total of seventy-four 1/40th acre plots was established (Figure 4). Egg mass counts range from 0 to 1480 and average 102 EM/A. Egg mass counts in the Piney Mountain area and at Cunningham Falls State Park now average 50 and 69 EM/A, respectively. The highest counts outside CMP are located between Stottlemeyer Road and Cunningham Falls State Park. Here egg mass counts range from 120 to 1480 and average 475 EM/A.

DISCUSSION

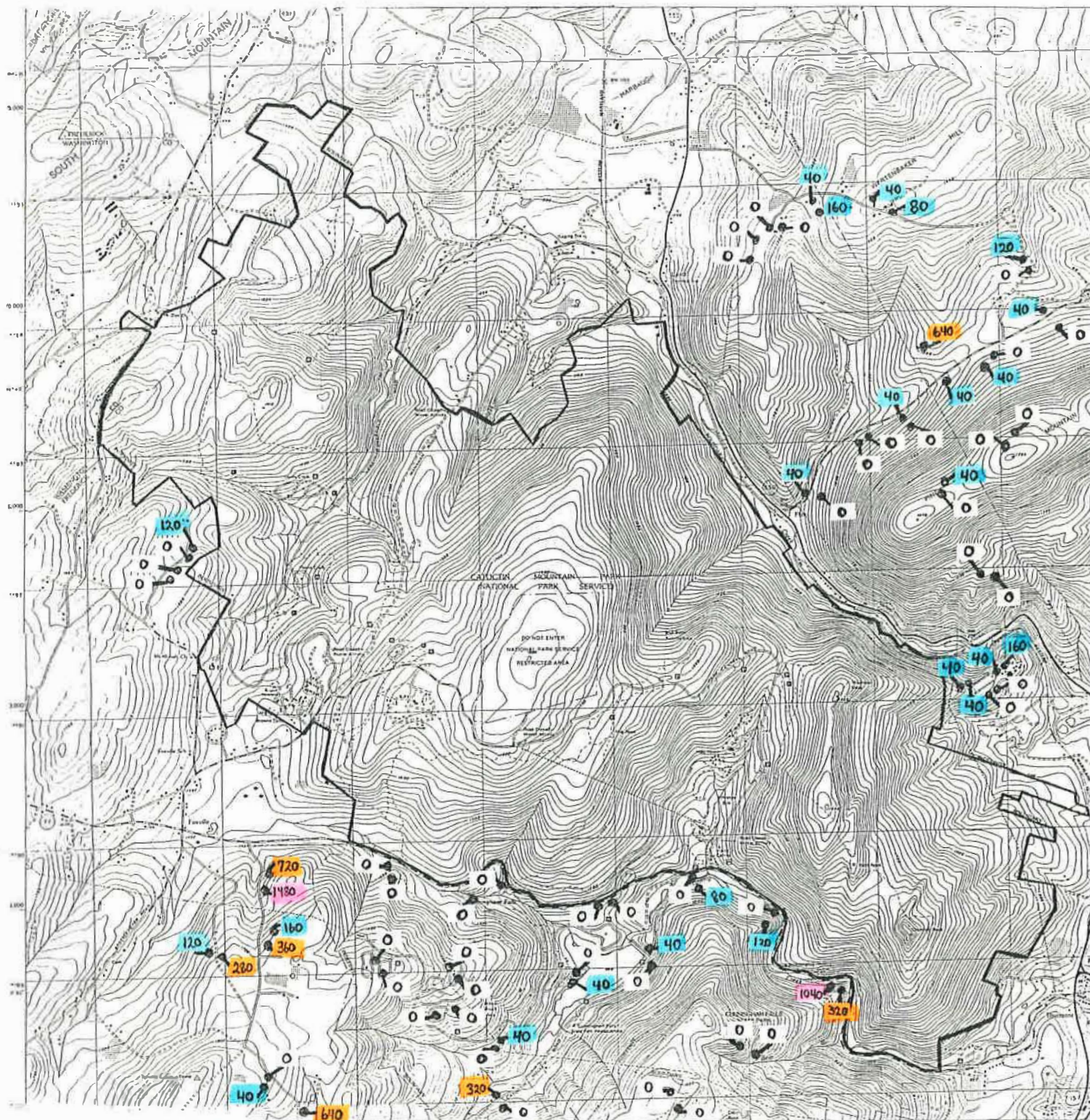
Gypsy moth populations are at their lowest level since Catoclin Mountain Park initiated the integrated pest management program. The low population level can be attributed to the suppression projects over the last few years at CMP and a natural collapse or decline of gypsy moth populations in and around CMP.

The 1989 suppression project successfully provided foliage protection and significantly reduced egg mass densities. No defoliation was detected on any of the 6 treatment blocks. Egg mass densities in the treatment blocks were reduced by an average of 95 percent. In most years, these two accomplishments would be remarkable considering the bad weather experienced and the applicators inability to provide the spray aircraft on the day we wanted it.

The results of the suppression project might be over-estimated considering the natural collapse of the gypsy moth at CMP and surrounding area. No defoliation was detected in untreated areas of CMP nor on areas adjacent to CMP. Egg mass densities in untreated areas of CMP have declined 79 percent since 1988. Egg mass densities outside the park have also declined and average 102 EM/A.

The program of activities in 1990 will be similar to that in 1989 except a large scale suppression project is not required. A defoliation survey will be conducted in late June or early July, male moth traps will be deployed by late June, and an egg mass survey will be conducted in the fall.

Figure 4.--1989 Gypsy Moth Egg Mass Survey Plot
Locations in Areas Surrounding Catoclin
Mountain Park.



LEGEND

- = 1/40th acre plot locations
- = 0 egg masses/acre
- = 1-249 egg masses/acre
- = 250-999 egg masses/acre
- = 1000+ egg masses/acre

Table 1.--Comparison of 1988-89 Male Moth Catches
by Grid Point, Catoctin Mountain Park

Grid Point	Male Moth Catches		Percent Change (+ or -)
	1988	1989	
C-3	592	198	- 66
C-4	886	293	- 67
D-2	1059	359	- 66
D-3	1605	84	- 95
D-4	928	37	- 96
E-1	1117	119	- 89
E-2	442	46	- 90
E-3	1820	32	- 98
E-4	910	7	- 99
E-5	540	4	- 99
F-1	1007	172	- 83
F-2	1599	327	- 80
F-3	261	1	- 99
F-4	831	15	- 98
F-5	133	0	-100
F-6	1137	352	- 69
F-7	*	*	
F-8	1359	608	- 55
G-2	1988	17	- 99
G-3	718	2	- 99
G-4	912	34	- 96
G-5	1550	133	- 91
G-6	1490	883	- 41
G-7	653	540	- 17
G-8	837	265	- 68
H-2	729	385	- 47
H-3	675	54	- 92
H-4	608	11	- 98
H-5	840	6	- 99
H-6	*	*	
H-7	415	227	- 45
H-8	603	373	- 38
I-2	737	128	- 95
I-3	771	837	+ 9
I-4	634	185	- 71
I-5	660	67	- 90
I-6	702	95	- 86
I-8	95	187	+ 97
I-9	2099	529	- 75
I-10	1278	452	- 65
I-11	1295	1545	+ 19
J-2	952	546	- 43

Table 1. (continued)

Grid Point	Male Moth Catches		Percent Change (+ or -)
	1988	1989	
J-3	293	317	+ 8
J-4	802	75	- 91
J-5	538	55	- 90
J-7	302	137	- 55
J-8	679	46	- 93
J-9	1742	65	- 96
J-10	963	132	- 86
J-11	1648	1028	- 38
J-12	1599	1082	- 32
K-4	1418	161	- 89
K-5	1224	87	- 93
K-6	336	213	- 37
K-7	617	149	- 76
K-8	971	189	- 81
K-9	1175	211	- 82
K-10	215	184	- 14
K-11	1280	348	- 73
K-12	1667	670	- 60
K-13	*	415	
K-14	*	1567	
L-4	795	336	- 58
L-5	1064	73	- 93
L-6	732	72	- 90
L-7	1238	103	- 92
L-8	1025	159	- 84
L-9	1178	120	- 90
L-10	1160	429	- 63
L-11	673	1167	+ 73
L-12	996	872	- 12
L-13	1327	904	- 32
L-14	1195	1215	+ 2
M-4	1198	*	
M-5	1418	1329	- 6
M-6	625	306	- 51
M-7	1082	207	- 84
M-8	1103	171	- 84
M-9	976	*	
M-10	910	542	- 40
M-11	1193	1383	+ 16
M-12	659	1213	+ 84
M-13	1278	1096	- 14

Table 1. (continued)

Grid Point	Male Moth Catches		Percent Change (+ or -)
	1988	1989	
M-14	1186	1096	- 8
N-11	1338	674	- 50
N-12	886	510	- 42
N-13	1188	687	- 42
O-12	1100	999	- 9
O-13	1442	1245	- 14
Grid Point Average	962	402	- 58

* = Traps not deployed.

Table 2.-- Comparison of 1988-89 Egg Mass Counts by Grid Point,
Catoctin Mountain Park

Grid Point	Egg Mass Counts (per acre)		Percent Change (+ or -)
	1988	1989	
C-3	0	0	0
C-4	40	0	-100
D-2	0	0	0
D-3	920	40	- 96
D-4	0	0	0
E-1	120	0	-100
E-2	0	0	0
E-3	520	0	-100
E-4	360	40	- 89
E-5	200	0	-100
F-1	0	0	0
F-2	0	0	0
F-3	0	0	0
F-4	40	0	-100
F-5	280	0	-100
F-6	120	0	-100
F-7	200	80	- 60
F-8	200	0	-100
G-2	0	40	+
G-3	120	0	-100
G-4	0	0	0
G-5	0	0	0
G-6	0	0	0
G-7	0	0	0
G-8	0	0	0
H-2	0	0	0
H-3	0	0	0
H-4	0	0	0
H-5	0	40	+
H-6	0	40	+
H-7	0	0	0
H-8	40	40	0
I-2	0	0	0
I-3	0	0	0
I-4	0	0	0
I-5	0	0	0
I-6	80	0	-100
I-8	0	0	0
I-9	720	0	-100
I-10	80	0	-100
I-11	0	0	0

Table 2. (continued)

Grid Point	Egg Mass Counts (per acre)		Percent Change (+ or -)
	1988	1989	
J-2	0	0	0
J-3	0	0	0
J-4	0	0	0
J-5	640	0	-100
J-7	40	0	-100
J-8	160	40	- 75
J-9	120	0	-100
J-10	0	0	0
J-11	0	0	0
J-12	120	0	-100
K-4	80	80	0
K-5	240	0	-100
K-6	360	0	-100
K-7	0	0	0
K-8	0	0	0
K-9	80	0	-100
K-10	40	40	0
K-11	0	0	0
K-12	80	40	- 50
L-4	80	0	-100
L-5	200	0	-100
L-6	0	0	0
L-7	1080	40	- 96
L-8	2480	200	- 92
L-9	40	0	-100
L-10	160	0	-100
L-11	0	0	0
L-12	0	0	0
L-13	600	40	- 93
L-14	640	0	-100
M-4	40	0	-100
M-5	160	0	-100
M-6	0	0	0
M-7	0	0	0
M-8	0	0	0
M-9	0	0	0
M-10	0	80	+
M-11	40	0	-100
M-12	0	80	+
M-13	320	0	-100
M-14	200	0	-100

Table 2. (continued)

Grid Point	Egg Mass Counts (per acre)		Percent Change (+ or -)
	1988	1989	
N-11	0	0	0
N-12	120	0	-100
N-13	40	0	-100
O-12	0	0	0
O-13	0	0	0
Grid Point Average	146	12	- 92

Table 3. -- Egg Mass Counts (per acre) at Each Five-Minute Walk
Location, Catoctin Mountain Park, 1988 and 1989.

Plot Number		Egg Mass Counts (per acre)		Percent Change (+ or -)
1988	1989	1988	1989	
34	1	76	0	-100
33	2	343	0	-100
32	3	507	0	-100
31	4	220	35	- 84
30	5	445	0	-100
29	6	158	0	-100
26	7	445	0	-100
25	8	2024	0	-100
27	9	138	0	-100
28	10	343	0	-100
17	11	76	35	- 54
15	12	179	0	-100
16	13	281	35	- 88
11	14	199	0	-100
4	15	5550	0	-100
1	16	2721	0	-100
2	17	4791	0	-100
10	18	1060	0	-100
13	19	240	0	-100
21	20	978	35	- 96
23	21	2454	0	-100
24	22	2618	0	-100
12	23	199	0	-100
22	24	1224	0	-100
18	25	343	97	- 72
19	26	138	0	-100

Table 4.-- Comparison of Pre- and Post-Treatment Egg Mass
Counts, Catoclin Mountain Park, 1989

Treatment Area	Egg Mass Counts (per acre)		Percent Change (+ or -)
	Pre-Treatment	Post-Treatment	
A	45	5	-89
B	298	4	-99
C	1324	5	-99
D	333	20	-94
E	341	14	-96
F	322	27	-92
Untreated	37	8	-79

CATOCTIN MOUNTAIN PARK

Figure 1.--1989 Gypsy Moth Treatment Areas,
Catoctin Mountain Park and Naval
Support Facility, Thurmont, MD.

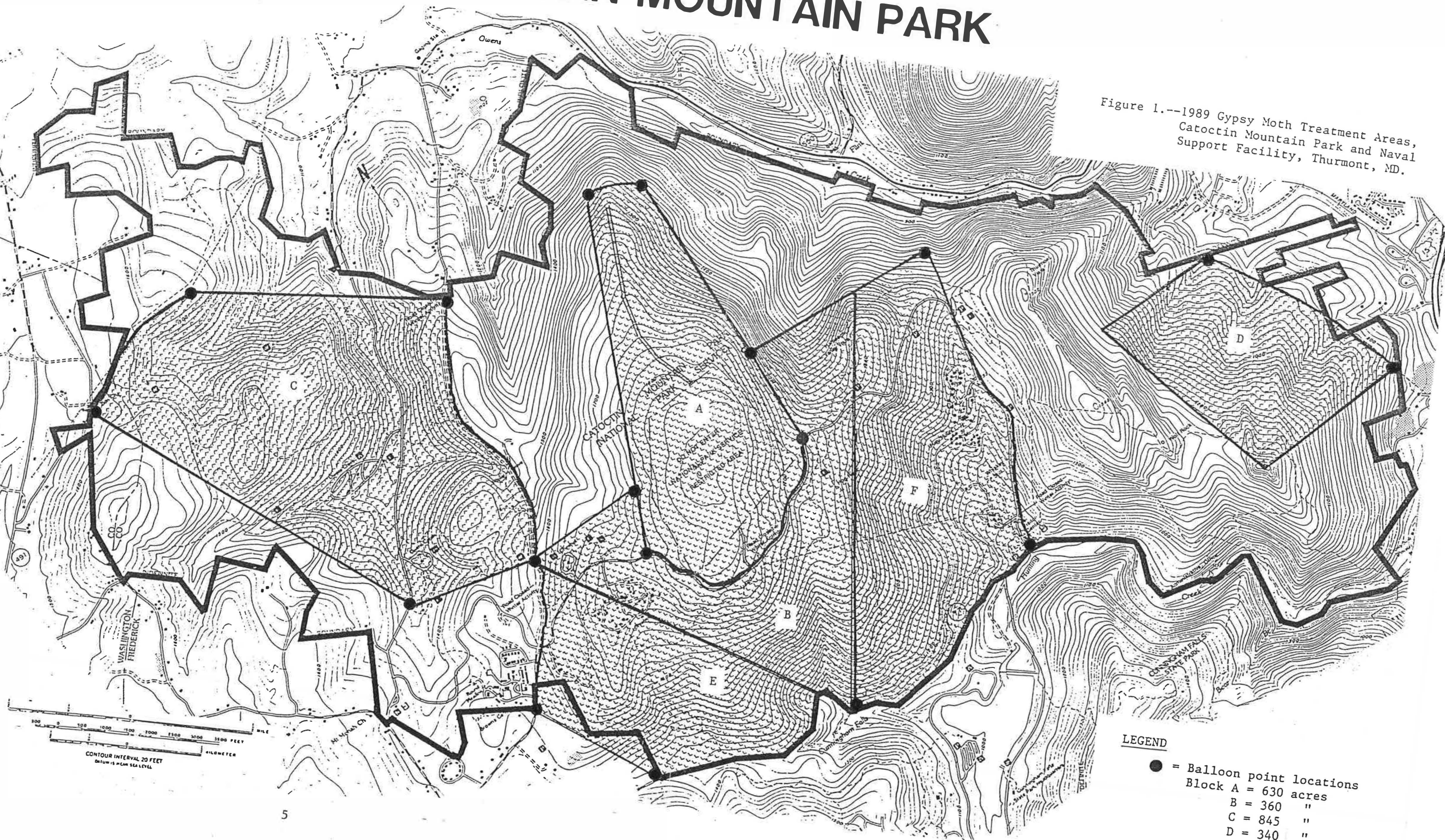


Figure 2.--Grid Point Locations and Male Moth Catches. 1989 Gypsy Moth Monitoring Activities.

CATOCTIN MOUNTAIN PARK

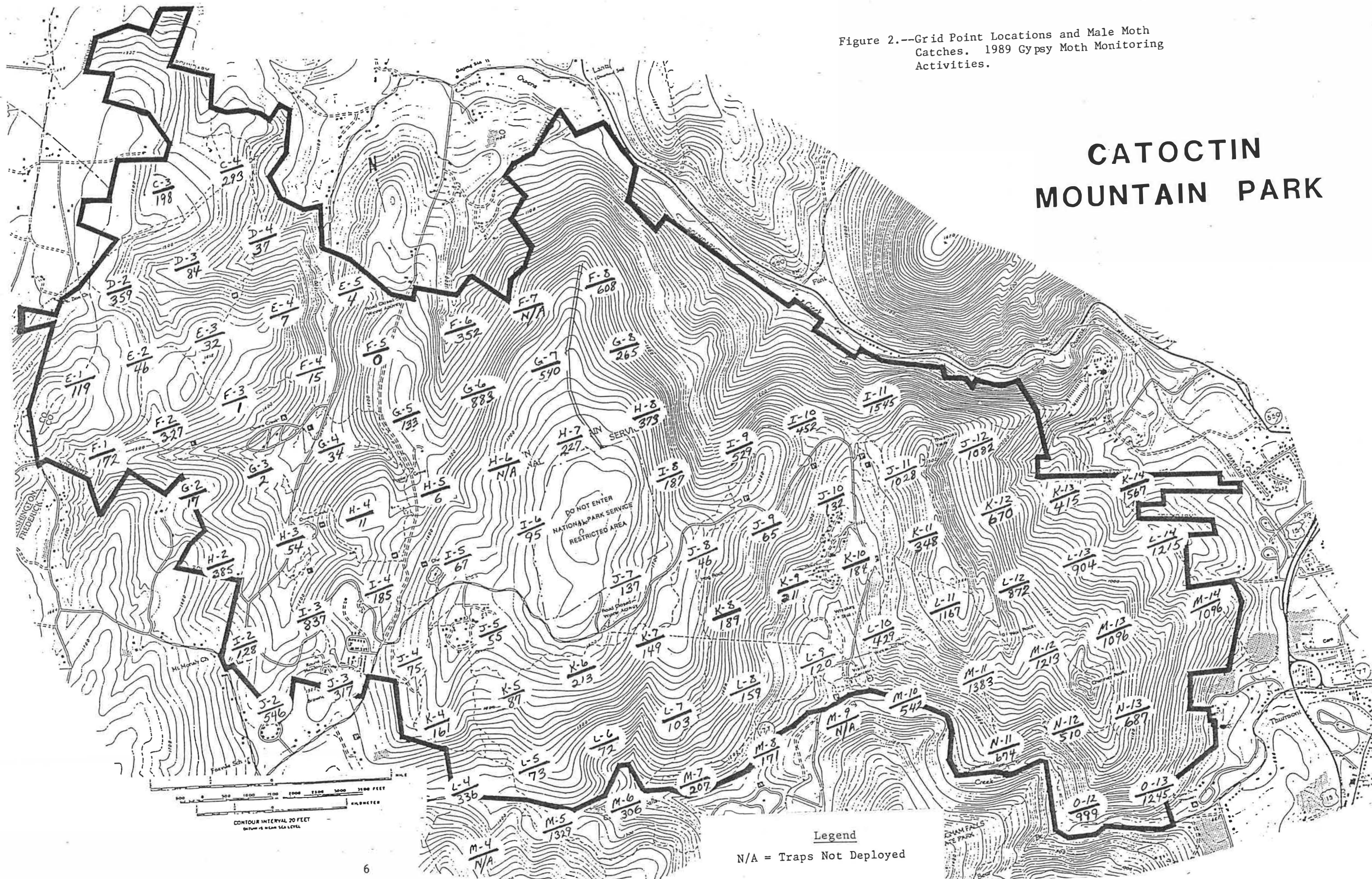
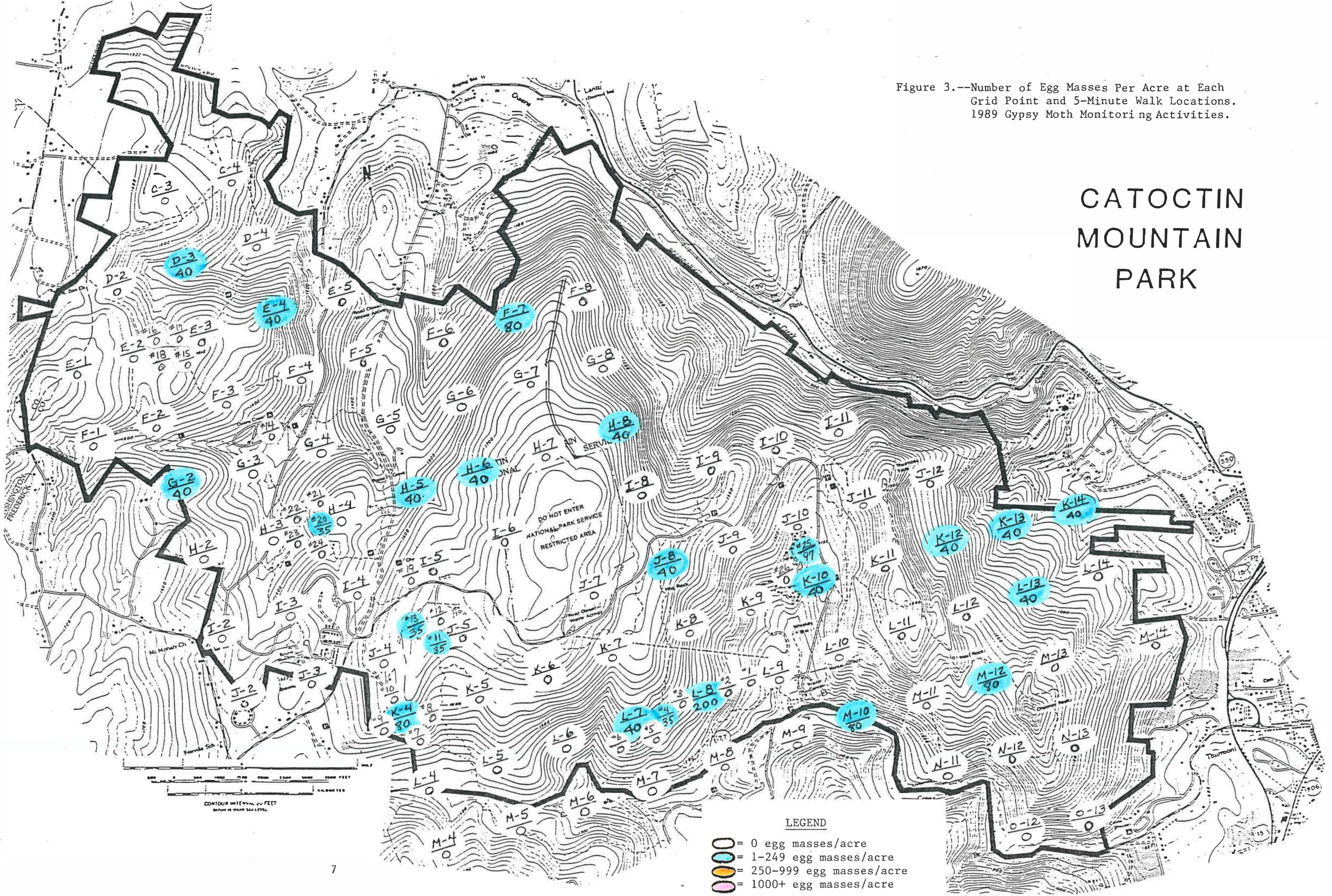


Figure 3.--Number of Egg Masses Per Acre at Each Grid Point and 5-Minute Walk Locations. 1989 Gypsy Moth Monitoring Activities.

CATOCTIN MOUNTAIN PARK



United States
Department of
Agriculture

Forest
Service

Northeastern Area
State and Private
Forestry

180 Canfield St.
Morgantown, WV 26505

Reply To: 3460

Date: February 26, 1990

Mr. Thomas McFadden, Superintendent
Catoctin Mountain Park
USDI National Park Service
Thurmont, MD 21788

Dear Mr. McFadden:

Enclosed is a copy of the 1989 Gypsy Moth Integrated Pest Management Program of Activities at Catoctin Mountain Park. In summary, gypsy moth populations in and around CMP are relatively low and a large scale suppression project is not needed in 1990.

We would like to thank the Park Service and the Naval Support Facility for all their time and efforts expended on this program. We look forward to your continued support in 1990.

Please call me at 304-291-4133 if you have any questions about this report.

Sincerely,

Rodney L. Whiteman

for

NOEL F. SCHNEEBERGER
Entomologist
Forest Pest Management

Enclosure

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RLW/mae